NASA-CR-205176

JOVE Final Report

Program Accomplishments and Research Continuation Plans

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I. Research

Brief summary of research results to date on your project.

We designed and constructed a centrifuge for high gravity materials science research. One Master's theses project on the directional solidification of Pb-Sn alloys demonstrated effects of high gravity on the fluid flow at the solid- liquid interface during processing. These results were published.

Another investigation applied flow visualization techniques to image flow patterns in a water cell. This activity supported our research proposal for aqueous growth of L-Anginin Phosphate Single Crystals in a high gravity environment. This proposal was well reviewed but ultimately denied funding.

Where do you see your JOVE research going after the initial JOVE funding expires:

This project has been dormant since 1994.

Communication with NASA Colleague

Marcus Vlasse and I continue to interact on other projects outside JOVE, specifically USML-2 science. Our JOVE collaboration ceased with the collapse of funding of the original high gravity experiment.

Refereed Journal Articles Published

C.C. Battaile, R.N. Grugal, A.B. Hmelo, T.G. Wang, "The Effect of Enhanced Gravity Levels on Microstructural Development in Pb-50 wt. pot. Sn Alloys During Controlled Directional Solidification, Met Trane 25(A), 865-870, 1994.

Other Publications Published

R.N. Grugel, A.B. Hmelo, C.C. Battaile and T.G. Wang, "Microstructural Development in Pb-Sn Alloys Subjected to High-Gravity During Controlled Directional Solidification Processing, "Materials Processing in High Gravity," L.L. Regal and W.R. Wilcox, Eds. Plenum Press, NY, pg. 101, 1994.

Proposals Submitted

Agency Submitted to: NASA *$ amount:* $90,004.00

Title/PI: An Investigation of the Effect of Convective Flow on the Seeded Growith of L-Arginine Phosphate. A. Hmelo, PI.

Period of Performance: 1991-1994 *Primary Use of Funds:* Experimental Research

Status: Denied

Are you utilizing the Internet or other network? If other, which?

E-mail and WWW in support of research activities.

II. Education

Assessment of Student Impact

The JOVE project has had minimal impact on the student enrollment at Vanderbilt University.

Student Research Assistants

Undergraduate Assistants	Research Area	Major
Chris Apple	Mechanical Engineering	M.E.
Chris Taylor	Mechanical Engineering	M.E.
Steve Eck	Mechanical Design	M.E.
Jeff McConnell	Fluid Development	M.E.
Graduate Assistants	**Research Area**	**Major**
Corbett Battaile	Mechanical Design and Metellurgy	Materials Science

III. Curriculum Development

New Curricula

One course was developed during this time frame. This course is entitled ES (Engineering Science) 153, which is Introduction to Space Policy. It is for undergraduates. This is one enduring legacy of the JOVE interaction, about 30 students per year.

IV. Outreach

Students

Outreach Effort	Location	Est. Number of Attendees
Eakin Elementary School	Nashville, TN	30
Akiva School (Elementary)	Nashville, TN	20
Head Middle School	Nashville, TN	30

Teachers

Outreach Effort	Location	Est. Number of Attendees
Martha Day, H.S. Teacher	Nashville, TN	1 (6 weeks)

V. Summer Programs

For Teachers

Martha Day was a Nashville, Tennessee, high school teacher who spent six weeks in Anthony Hmelo's laboratory learning laboratory technique. Summer 1995.

VI. "Roadblocks" to Progress"

There could have been more cooperation on the sharing and relocation of critical equipment between Marshall Space Flight Center and Vanderbilt University. As this was not the case, research focus was adjusted to accommodate the realities of what we were able to do at Vanderbilt using the equipment we had.

VI. How could the program be changed to make it more effective?

Provide a pathway within NASA proposal review to recognize and prioritize JOVE seeded research proposals. It would have been most rewarding if Headquarters sponsored our work at a critical stage in the development of our plan.

VII. Overall, what has been your institution's greatest benefit from participating in JOVE?

Provided access to advice and expertise in the form of the JOVE mentor. In this case, Marcus Vlasse.

VIII. Please list all subject inventions as a result of this award or provide a statement that there were none.

No inventions resulted from this Activity.